First Multinational AirMedEvac Crew Concept in NATO

LtCol Dr. Christian Vogl
Fliegerarzt Jagdgeschwader 74
Wilhelm-Franke-Kaserne 13
D-86633 Neuburg an der Donau
GERMANY

ChristianMichaelVogl@Bundeswehr.org

Maj Dr. Christian Strobl
Fliegerarzt Lufttransportgeschwader 61
Kauferinger Str. 130
D-86929 Penzing
GERMANY

ChristianStrobl@Bundeswehr.org

EXPERIENCES WITH THE GERMAN-DUTCH COOPERATION IN PREPARATION FOR AND DURING THE EXERCISE VOLCANEX 09

Already in the exercise VOLCANEX 08 a multinational crew concept was requested. Due to national requirements of certified training and lack of lead time a realisation was not feasible. Therefore in 2009 an academic curriculum was developed, which made the assignment of foreign soldiers in a German AirMedEvac C-160 possible.

From 3rd to 10th of November 2009 the NATO exercise VOLCANEX 09 took place in Villafranca/Italy. The German Air Force participated with a C-160 Transall in MedEvac configuration to display the StratAirMedEvac part. The medical crew, consisting of a flight surgeon and five flight nurses, was provided by the Royal Dutch Air Force. In preparation for the exercise the designated Dutch staff had been sent to the Air Transport Wing 61 in Penzing/Germany from 31.08. to 03.09.2009 for instruction in the German AirMedEvac system. The Dutch crew who went through this education were prepared for their job aboard the airplane and were certificated by GAF national directives as German crews are.

In preparation for and during the exercise synergies, differences and possibilities of improvement were successfully identified. For standardization of multinational operations it is necessary to develop international training requirements. These should include documented proficiency in handling of the medical equipment and instruction in the aircraft type (especially rescue and safety instruction). Therefore the medical equipment used in AirMedEvac, the educational guidelines and the provided aircraft of each nation have to be checked and listed. After a comparison of these lists, overlappings and divergencies between the national system and the multinational requirements could be identified and these gaps could be closed where applicaple. Last not least regular or periodic refresher practice for foreign crews in the different national systems will have to be provided.

With the training of the Dutch soldiers in the German AirMedEvac system and the successful realisation of the exercise VOLCANEX 09 the first step into the direction of a multi-national crew concept is done. This marks a milestone in the German and also European flight medicine. Particulary with regard to the increasing number of UN- and EU-missions this development should be sped up forcefully.

1 INTRODUCTION

Joint NATO-Missions demonstrate the requirement of a multinational AirMedEvac crew concept. Already in the exercise VOLCANEX 08 a multinational crew concept was requested. Due to German national requirements of certified training and a lack of lead time the realisation was not feasible, but the practical realisation was judged as sensible.

Therefore, it was planned for the exercise in 2009 to use a German Transall C-160 with medical staff of another nation. After preliminary talks and appointments a cooperation with the Dutch air force

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14. ABSTRACT
Already in the exercise VOLCANEX 08 a multinational crew concept was requested. Due to national requirements of certified training and lack of lead time a realisation was not feasible. Therefore in 2009 an academic curriculum was developed, which made the assignment of foreign soldiers in a German AirMedEvac C-160 possible.

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succeeded. The arrangement planned to train the Dutch soldiers in November in Germany for the exercise. Because the Dutchmen already disposed of a wide knowledge in flight medicine and flight physiology, the participants agreed to limit the education to the contents with which the Dutch soldiers were not familiar till that time. So the main focus was put on the instruction in the medical equipment, the instruction in the airplane C-160 Transall (in particular rescue and safety systems) and the instruction about the specific features and the regulations of the German AirMedEvac system. As time frame one week was attached.

As another practical aim the use of a standardised patient's transfer file should be tested. The form was made available by the Italian Army. The Italians were also to demonstrate their NBC-module (ProSer s.r.l Aircraft Transit Module) for contaminated patients. Here the ambition was to observe, if that module is capable for AirMedEvac and for the use in a German C-160 Transall.

2 BASIC PRINCIPLES

Basis of all AirMedEvac missions within NATO is the STANAG 3204. It was already known to the Dutchmen as a NATO partner. In addition, the German armed forces have remitted Standing Operating Procedures (SOP). Therein the procedures and approaches with strategical air transport of wounded and sick persons are regulated. For better understanding the contents should be briefly shown at this point.

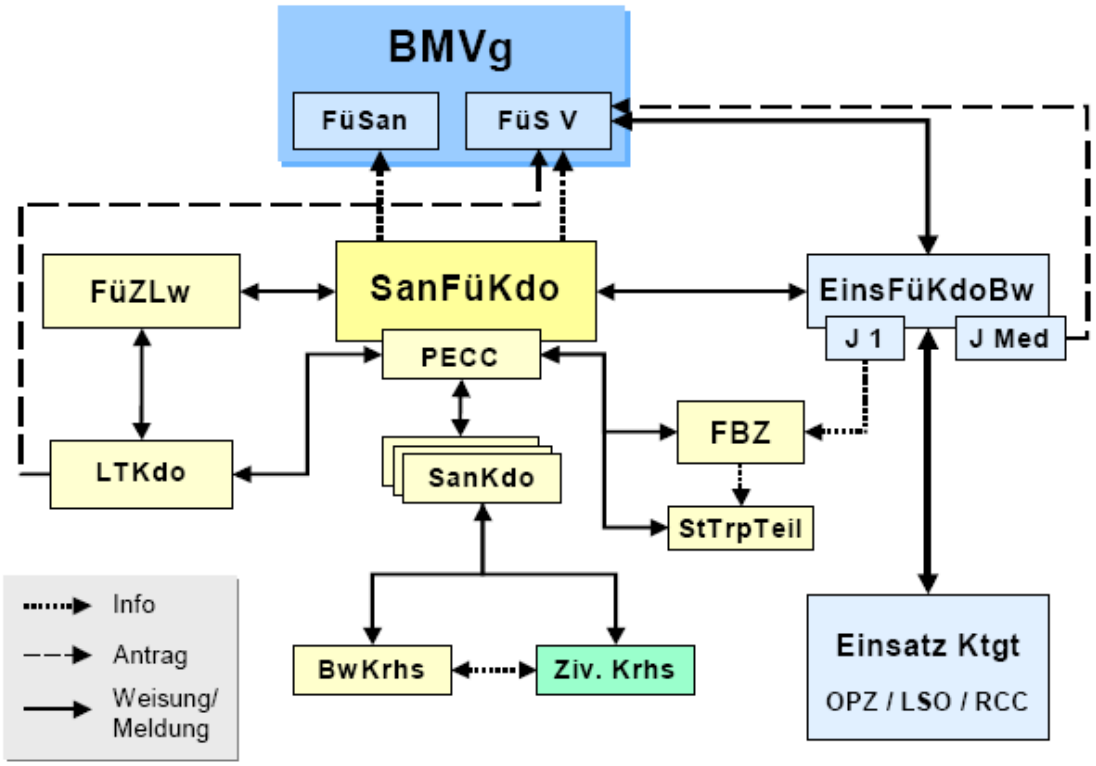


Figure 1: Operation of a StratAirMedEvac mission.

The medical forces of the German armed forces run a Patient Evacuation Control Centre (PECC) which coordinates the missions and handles and prioritises incoming requests. The use of an airplane is arranged on request by the Air Transport Command (Air Force). Therefore the Air Force provides constantly an Airbus A-310, a Challenger CL-601 and a Transall C-160 in MedEvac configuration. Which airplane is used, the Command Surgeon of the Air Transport Command decides. He also defines restrictions in the

flight profile if necessary (e.g., altitude limitation), the flight schedule and the crew concept. The regular crew concept of the different airplanes is shown in the following table.

Table 1: Regular crew concept in German MedEvac airplanes.

Function / Qualification	Responsible department	Quantity in A-310	Quantity in C-160	Quantity in CL-601
Medical Director / Med. Doctor, Flight Surgeon, General Practitioner, Emergency Medicine	Air Force	1	1	1
Medical Technician / Medic Sergeant, Aidman, Medic Matter	Air Force	1	1	1
Anaesthesiologist / Med. Doctor	Medical Forces	2	1	1
Emergency Medicine / Medical Doctor, General Practitioner	Medical Forces	1		
Emergency Med. / Medical Doctor	Medical Forces	1	1	
Anaesthesiological Assistant / Medic Sergeant	Medical Forces	2	1	1
Medical Crew Chief / Medic Sergeant, Flight Nurse, Paramedic	Medical Forces	1	1	
Paramedic / Medic Sergeant (thereof with experience in intensive care)	Medical Forces	6 (4)	2	
Aidman / Medic Sergeant	Medical Forces	4	4	
Nurse Assistant / Medic Corporal	Medical Forces	6		
Total		25	12	4
Maximum of intensive care pat.		6	3	1
Maximum of litter patients		38	8	0

3 INSTRUCTION

The instruction of one Dutch flight surgeon and five Dutch flight nurses took place from October 31st to November 3rd at the Air Transport Wing 61in Penzing/Germany. In preparation for the instruction a time schedule was worked out by the flight surgeon of the Air Transport Wing 61. This time table based on the schedules of the instruction courses "AirMedEvac officer" and "AirMedEvac sergeant" which are normally held at the Institute for Aviation Medicine of the Air Force in Fuerstenfeldbruck/Germany.

As already mentioned the lectures about flight medicine and flight physiology were canceled. We also concentrated on the lessons for the MedEvac airplane C-160 Transall and not for the Airbus A-310 or the Challenger CL-601. The contents of the instruction were mainly the medical equipment and the airplane rescue and safety equipment of a Transall C-160. The schedule that had been worked out is shown in the following table.

Table 2: Time schedule for instruction in Penzing.

Subject	Number of lessons
German AirMedEvac system and organisation	5
Medical equipment and MedEvac airplanes	3
Use of the medical equipment	11
Rescue and safety equipment of a C-160	3
Training flight	3
Briefing / Debriefing / Documentation	3

On Monday 31st of August the Dutch participants arrived in Penzing. We started with an introduction of the German AirMedEvac system which was lectured by Col Dr. Grell (MD), the Command Surgeon of the Air Transport Command.

Figure 2: Sgt Den Dekker, Sgt van Wenzel, Sgt Arp, Sgt Smits, 1stLt Hannemann, Col Dr. Grell, LtCol Verhulst, Maj Dr. Strobl (from left to right).

In the next days the Dutch soldiers were intensively prepared for a AirMedEvac mission on a C-160 Transall as planned in the exercise VOLCANEX 09. For that they had to be instructed in all the medical equipment used on board. That contained the following devices:

- Respirator Oxylog 3000

- Respirator Oxylog 2000
- Respirator Lifebase III with Medumat Standard
- Patient monitor Propaq 106 EL
- Combimat 2000 CS03
- Infusiomat IP 2000-V
- Suction unit Accuvac
- ECG/Defibrillator Zoll M
- ECG Schiller AT-10
- Pulsoxymeter Nellcor
- Mobile Ultrasound unit Sono Site Plus
- Blood analysis unit I-Stat
- Patient warming system Barkey

The instruction included theoretical lectures and time to get familiar with the devices and work with them for practise.

Figure 3: Instruction in using the mobile ultrasound unit.

The only medical device which the Dutchmen could not be instructed in, was the respirator Evita 4. That was because of the fact, that this respirator is a very complex intensive care ventilator and the instruction

would take one day at minimum just for this device. Moreover the use of the Evita 4 requires special qualifications and knowledge in management of intensive care patients, normally only anaesthesiologists have.

After the instruction in the rescue and safety equipment of the airplane the Dutch soldiers had to learn how to fix the medical equipment into a Transall C-160, which is rather hard work and takes about two hours including the testing of the equipment. At this point the Dutchmen were instructed in the use and the technical features of the Patient Transport Unit (PTE). It is an intensive care unit for one patient with many medical devices and equipped with pressurised oxygen and air.

Figure 4: Instruction in the Patient Transport Unit (PTE).

A practise flight on the 2nd of September 2009 with the fully equipped C-160 Transall formed the highlight of the instruction course. During the flight the patients´ care and the use of the medical devices was again practiced and deepened. Besides, some emergencies to which the course participants had to react adequately were played in.

When the Dutch soldiers were dismissed on the 3rd of September, they felt well prepared for the exercise and also in the situation to be able to complete real AirMedEvac missions successfully. So the course was evaluated by all partners as a big success.

Figure 5: Patients' care during the training flight.

4 EXERCISE VOLCANEX 09

The exercise VOLCANEX09 took place in Villafranca/Italy from 3rd till 10th of November 2009. Our part was the demonstration of the StratAirMedEvac part on two days of the exercise. This part was displayed with a C-160 Transall in MedEvac configuration. The distribution of the functions is shown in the following table.

Table 3: Functions on the C-160 in VOLCANEX09.

Function	Nation
Flight Crew (pilot, co-pilot, technician, loadmaster)	Germany
Medical Director	Germany
Medical Technician	Germany
Anaesthesiologist	not displayed
Emergency Med. (MD)	Netherlands
Anaesthesiological Assistant	not displayed
Medical Crew Chief	Germany
Paramedic	Netherlands
Aidman	Netherlands

On the first day the request was to provide the transport of nine patients (near maximum patient loading) with different injuries. The focus was laid on patient documentation. The mission on the second day was to take care of three patients during a AirMedEvac flight. During transportation some medical complications were played in to simulate a more stressful mission. The focus of that second day was laid on teamwork and cooperation.

The coordinated understanding between air force and medical force (i.e. flight crew and medical crew) and the crew management and teamwork between the German and Dutch crew members was excellent. For example the loading and unloading of the patients by the instructed medical crew was good, while the assistance of the not-instructed Italian personnel did not improve the output.

A deficiency was that the respirator Evita 4 could not be used because of the mentioned problems during instruction. That led to a small loss of quality but not to consequences in the patients' outcome. It has to be mentioned that the coordination by the German medical technician has particularly contributed to the good results. The biggest problem was the documentation, which did not prove itself in the exercise. Therefore, the transfer of the patients between the different nations turned out extremely problematically.

Figure 6: Patient transfer during the exercise.

In another part of the exercise the Italian NBC transport module was fixed into a Belgian C-130 and flew a highly contagious patient from Parma to Villafranca. The system is suitable for the air transport of highly contagious patients and has proved itself in the exercise. It has to be checked next, whether the system also can be fixed in other airplanes (e.g. the German C-160 Transall).

5 CONCLUSIONS

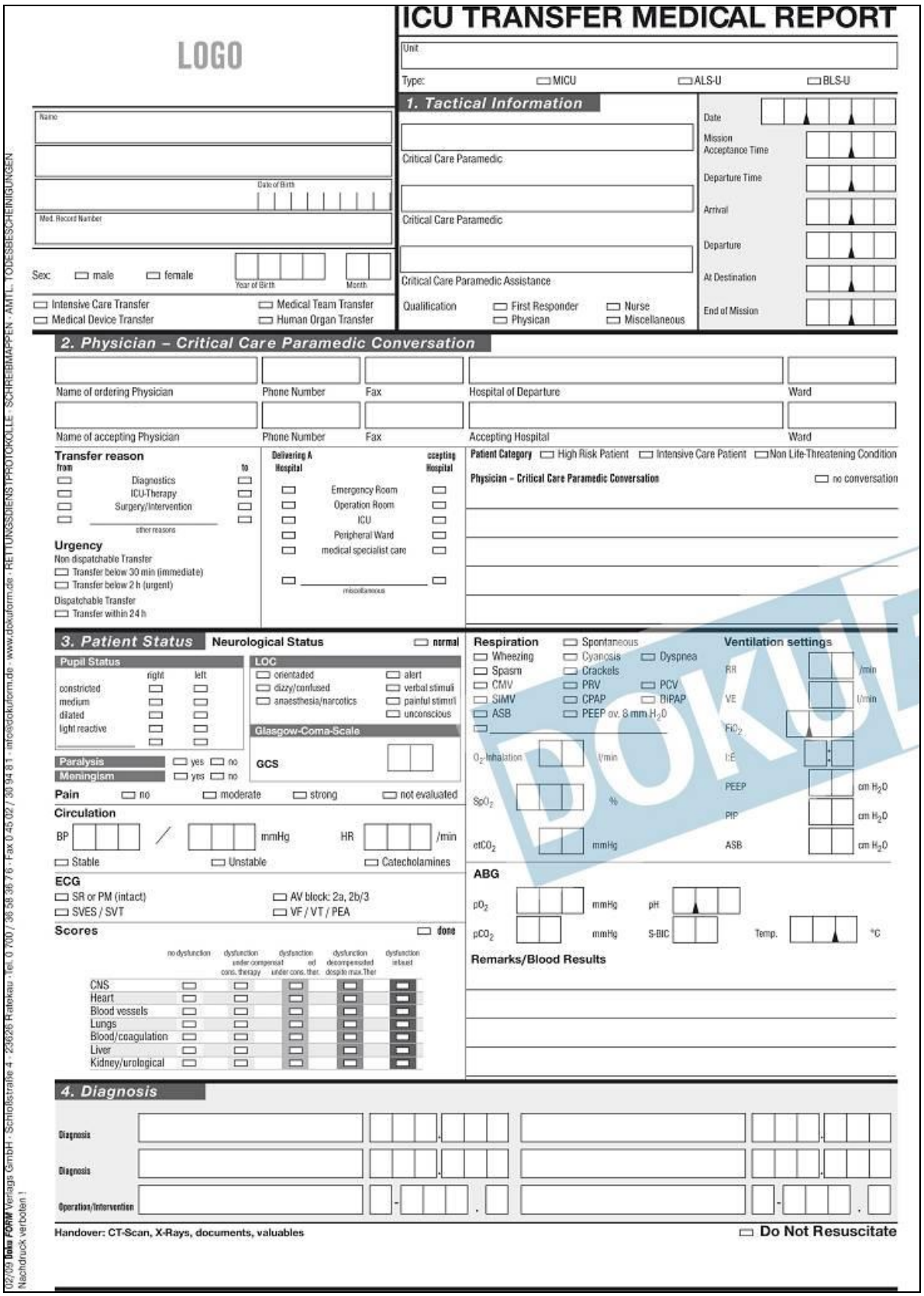
The German crew concept is multinational implementable without loss of quality under the following conditions:

- The flight crew, the medical director, the medical crew chief and the medical technician have to be German crew (i.e. host nation).
- The medical crew has to go through a dedicated instruction programme before set on the airplane of the host nation.
- The medical crew has to bring experience in emergency medicine and flight medicine with them. In that process synergies have to be utilised (e.g. the training of a Dutch flight nurse is to be rated higher than the training of a German paramedic).
- With seriously injured patients (e.g blast injuries) the application of an anesthesiologist is absolutely necessary.

Moreover, the following knowledge could be won:

- Documentation has to be standardised with a printed form in English language, e.g. the “ICU Transfer Medical Report” of the German company Dokuform (see Figures 8 and 9).
- The Italian NBC-module is good for air transport of highly contagious patients. The possibility of the use of the module in other aircraft types has to be checked.

Figure 7: Italian NBC module.



LOGO

ICU TRANSFER MEDICAL REPORT

Unit

Type: ☐ MICU ☐ ALS-U ☐ BLS-U

1. Tactical Information

Name

Date of Birth

Med. Record Number

Sex: ☐ male ☐ female Year of Birth Month

☐ Intensive Care Transfer ☐ Medical Team Transfer

☐ Medical Device Transfer ☐ Human Organ Transfer

Critical Care Paramedic

Critical Care Paramedic

Critical Care Paramedic Assistance

Qualification ☐ First Responder ☐ Nurse ☐ Physican ☐ Miscellaneous

Date

Mission Acceptance Time

Departure Time

Arrival

Departure

At Destination

End of Mission

2. Physician – Critical Care Paramedic Conversation

Name of ordering Physician | Phone Number | Fax | Hospital of Departure | Ward

Name of accepting Physician | Phone Number | Fax | Accepting Hospital | Ward

Transfer reason

from / to

☐ Diagnostics ☐

☐ ICU-Therapy ☐

☐ Surgery/Intervention ☐

☐ other reasons ☐

Urgency

Non dispatchable Transfer

☐ Transfer below 30 min (immediate)

☐ Transfer below 2 h (urgent)

Dispatchable Transfer

☐ Transfer within 24 h

Delivering A Hospital / accepting Hospital

☐ Emergency Room ☐

☐ Operation Room ☐

☐ ICU ☐

☐ Peripheral Ward ☐

☐ medical specialist care ☐

☐ miscellaneous ☐

Patient Category ☐ High Risk Patient ☐ Intensive Care Patient ☐ Non Life-Threatening Condition

Physician – Critical Care Paramedic Conversation ☐ no conversation

3. Patient Status

Neurological Status ☐ normal

Pupil Status

	right	left
constricted	☐	☐
medium	☐	☐
dilated	☐	☐
light reactive	☐	☐
	☐	☐

LOC

☐ orientated ☐ alert

☐ dizzy/confused ☐ verbal stimuli

☐ anaesthesia/narcotics ☐ painful stimuli

☐ unconscious

Glasgow-Coma-Scale

GCS

Paralysis ☐ yes ☐ no

Meningism ☐ yes ☐ no

Pain ☐ no ☐ moderate ☐ strong ☐ not evaluated

Circulation

BP / mmHg HR /min

☐ Stable ☐ Unstable ☐ Catecholamines

ECG

☐ SR or PM (intact) ☐ AV block: 2a, 2b/3

☐ SVES / SVT ☐ VF / VT / PEA

Scores ☐ done

	no dysfunction	dysfunction under compensat cons. therapy	dysfunction ed under cons. ther.	dysfunction decompensated despite max.Ther	dysfunction intoxic
CNS	☐	☐	☐	☐	☐
Heart	☐	☐	☐	☐	☐
Blood vessels	☐	☐	☐	☐	☐
Lungs	☐	☐	☐	☐	☐
Blood/coagulation	☐	☐	☐	☐	☐
Liver	☐	☐	☐	☐	☐
Kidney/urological	☐	☐	☐	☐	☐

Respiration ☐ Spontaneous

☐ Wheezing ☐ Cyanosis ☐ Dyspnea

☐ Spasm ☐ Crackels

☐ CMV ☐ PRV ☐ PCV

☐ SIMV ☐ CPAP ☐ BIPAP

☐ ASB ☐ PEEP ov. 8 mm H_2O

☐

O_2-Inhalation l/min

SpO_2 %

$etCO_2$ mmHg

Ventilation settings

RR /min

VE l/min

FiO_2

I:E :

PEEP cm H_2O

PIP cm H_2O

ASB cm H_2O

ABG

pO_2 mmHg pH

pCO_2 mmHg S-BIC Temp. °C

Remarks/Blood Results

4. Diagnosis

Diagnosis

Diagnosis

Operation/Intervention

Handover: CT-Scan, X-Rays, documents, valuables

☐ Do Not Resuscitate

Figure 8: Page 1 of ICU Transfer Medical Report (© by Dokuform).

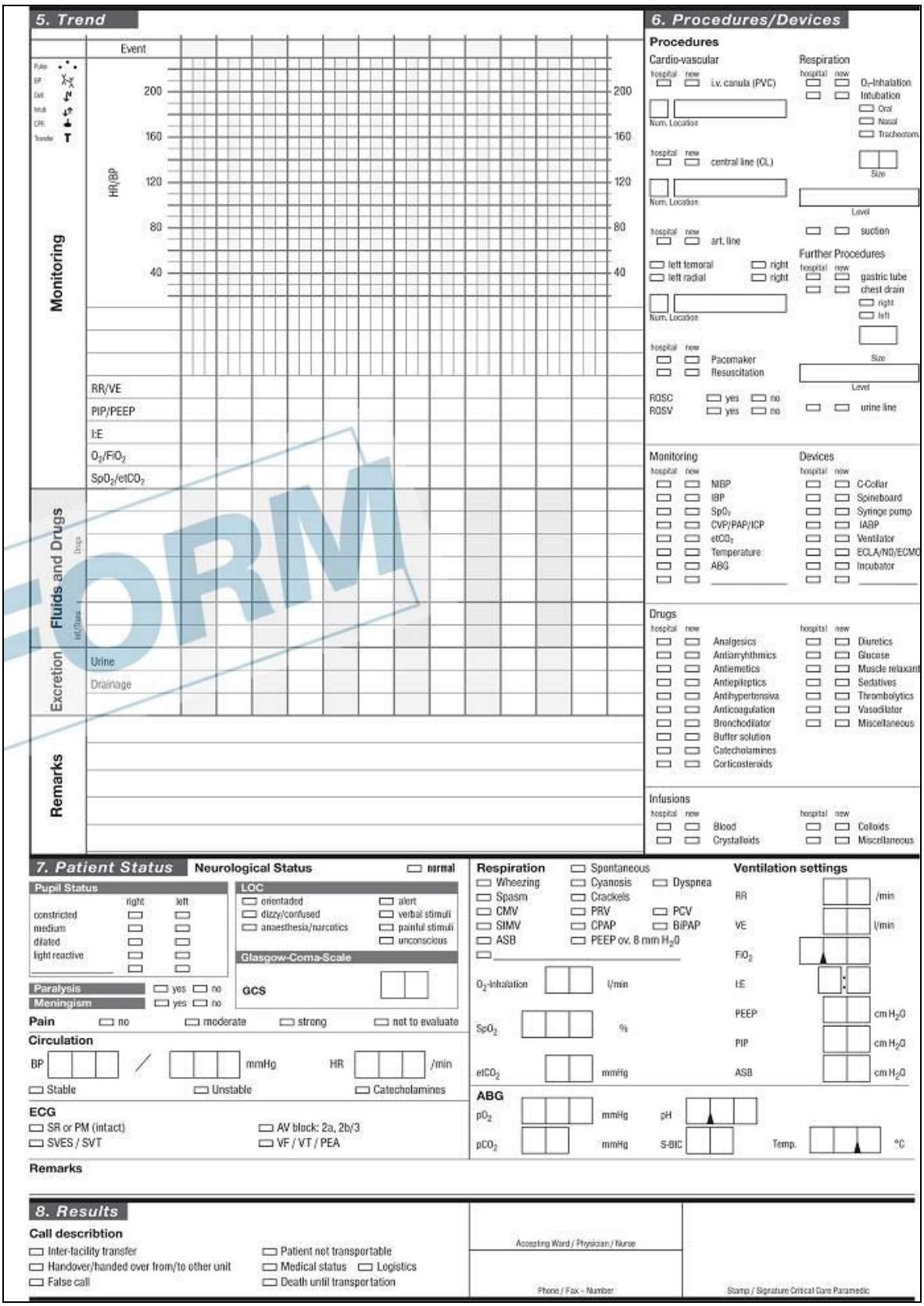


Figure 9: Page 2 of ICU Transfer Medical Report (© by Dokuform).

6 FUTURE PROSPECTS

The demonstrated professionalism in qualified AirMedEvac should be maintained and improved in other exercises. Therefore the integration of foreign medical crews in the German StratAirMedEvac system is recommended. The medical crew have to take part in AirMedEvac missions and refresher trainings periodically. With periodic refresher trainings it would be possible to additionally instruct the use of the more complex medical devices like the respirator Evita 4 or the bronchoscope.

The ambition in the long term has to be the application of multinational medical crews in AirMedEvac missions abroad, for which even more synergies have to be utilised. Therefore it is necessary to develop international training requirements. This should include documented proficiency in the handling of the medical equipment and instruction in the aircraft type (especially rescue and safety instruction). The medical equipment used in AirMedEvac, the education guidelines and the provided aircraft of each nation have to be compared, so that similarities and differences between the national system and the multinational requirements could be identified and gaps could be closed where applicable.